ERIE

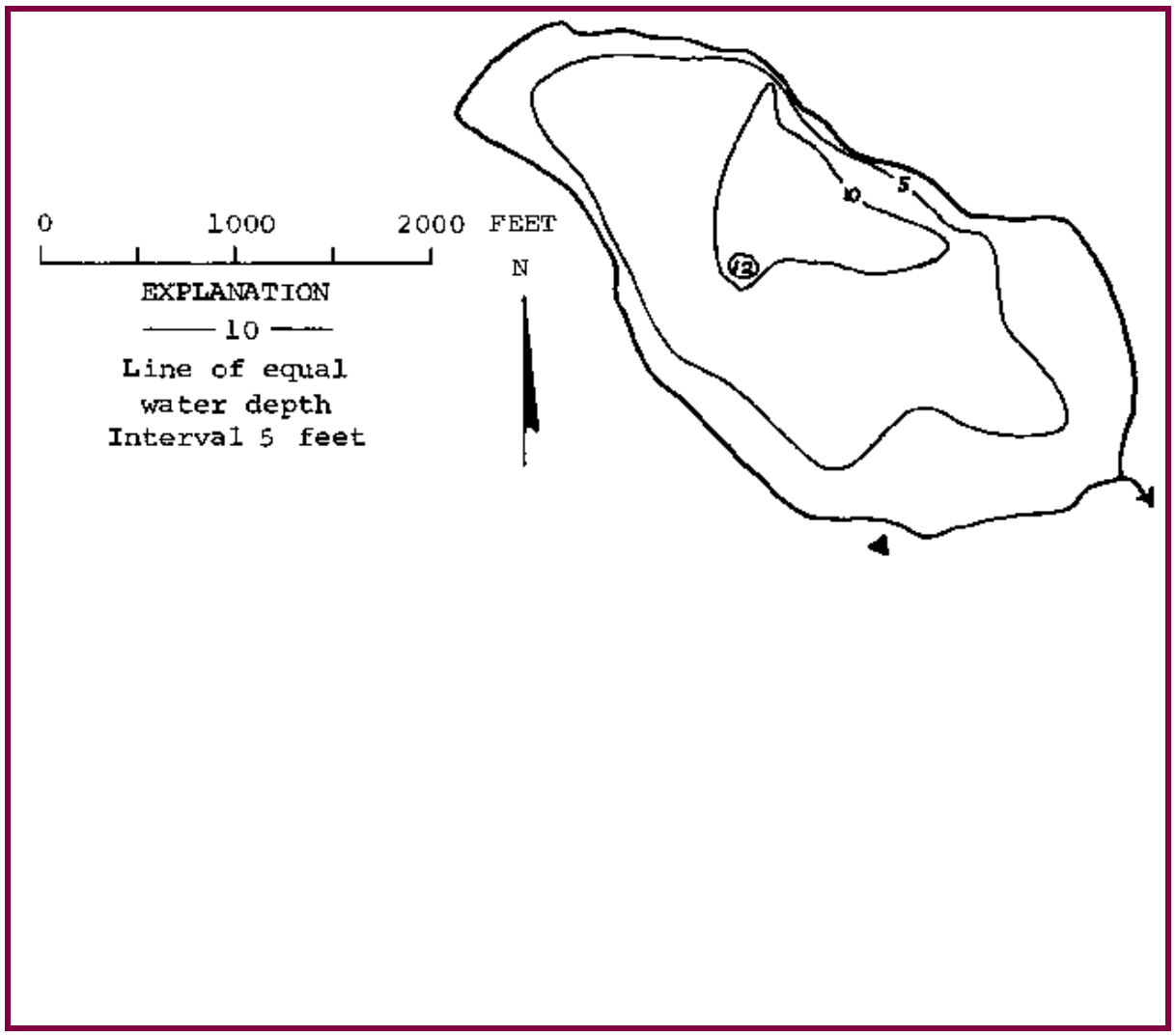
SKAGIT County

Lake ID: *ERISK1*

Ecoregion: 2

Lake Erie is located approximately three miles south of Anacortes. It is in the upper watershed of Campbell Lake and drains via a small stream and Campbell Lake to Simlik Bay. The abundant macrophytes of this shallow lake are mechanically harvested.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
113	12	6	2	
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
711	1.82	140	48 26 59.	122 38 15.



Station Information

ERISK1

Primary Station	Station # 1	latitude: 48 27 18.5	longitude: 122 38 27.4
	Description:	Deep part of lake, about 750 feet west of the northern tip of a small "cove" (very small, really barely a cove), on the western shore.	

Trophic State Assessment for 1999

ERIE

Analyst: Sarah O'Neal

TSI_Secchi:	[a] 55	W
TSI_Phos:	53	
TSI_Chl:	52	
Narrative TSI:	[b] E	

Erie Lake is a very small, shallow, naturally eutrophic lake. Abundant macrophytes grew in the lake, though the plant community consisted of native and diverse species. Mechanical harvesting throughout the growing season controlled plants for several years. Algae was present, though not particularly problematic in the lake. Secchi measurements decreased over the summer, likely due to increasing algal growth. On one occasion, plants interfered with the Secchi measurement, which caused a slight overestimation of Secchi TSI. Nutrient levels were typical of an eutrophic system. Total phosphorus increased slightly over the course of the summer. Shallow depths prevented stratification. The lake sits in a largely residential watershed, with about twenty houses surrounding the lake itself. The shoreline was mostly natural, and buffers present around streams and wetlands in the watershed likely helped protect water quality.

Unfortunately, no questionnaires were completed for the lake. The lake served as habitat for wildlife including otters and bald eagles. Fishers also heavily used the lake. WDFW managed the lake primarily for rainbow trout. They planted about 15,000 fish each April. Native anadromous cutthroat trout occasionally used the lake, though it requires difficult downstream navigation through Campbell Lake. Warmwater fish species in the lake included large- and smallmouth bass and perch. The fishing season opened from the last Saturday in April through October, and about 2000 anglers regularly visited the lake on opening day alone. Small zooplankton sizes indicated a possible overabundance of planktivorous fish species and an inadequate number of piscivores.

The lake's presumably natural eutrophic state supported its known beneficial uses. Consequently, we recommend a total phosphorus criterion for the lake of 33.7 ug/L (mean 28.8 ug/L plus standard deviation of 4.9 ug/L).

Mean Secchi = 1.4m (W); Mean TP = 28.8 ug/L; Mean Chl = 8.85 ug/L

[a] TSI Qualifiers: B or W-Secchi Disk hit bottow or entered weeds; J-Estimate; N-Fewer than the required number of samples

[b] E=eutrophic, ME=mesoeutrophic, M=mesotrophic, OM=oligomesotrophic, O=oligotrophic

Chemistry Data

ERIE

Date	Time	Strata	Tot P (ug/L	Tot N (mg/L)	TN:TP	Chloro-phyll (ug/L)	Fecal Col. Bacteria (#/100mL)	Hardness (mg/L)	Calcium (ug/L)	Turbidity (NTU)
Station 0										
6/8/1999		L					2			
		L					5			
7/14/1999		L					12			
		L					1 U			
8/10/1999		L					4			
Station 1										
6/8/1999		E	25.1	.742	30	3.7		78.3	16200	1.2
7/14/1999		E	29.4	.911	31	14.8				2.5
8/10/1999		E	28.2	.877	31	8.8				
9/17/1999		E	32.1	.794	25	9.5				

Strata: L=lake surface, E=epilimnion, H=hypolimnion; Qualifier: J=Estimate, U=Less than, G=Greater than.

Watershed Survey

ERIE

Survey Date: 9/17/1999

Land Uses (1 = Primary, 2 = Secondary, etc.)

- [3] **Agriculture(commercial, not hobby)**
- [2] **Commercial, Industrial**
- [ ] **Major transportation**
- [1] **Residential**
- [4] **Park, forest or natural**

Impervious surfaces (Roads and parking area): No Curbs

Observations (check mark denotes presence)

BMP's ☑

Mostly natural shoreline

Odors ☐

Cattle ☐ **Ducks** ☐ **Geese** ☐

Fertilizers and weed killers appear to be used in residential or agriculture area ☐

Buffer zones around streams and wetlands ☑

Buffers zones observed

Irrigation ☐

Survey Id: 30

Habitat Survey Summary Report

ERIE

Data are averages of ***10*** **Stations Surveyed** **Date of Visit:** 9/16/1999

Vegetation Type (Avg. only of sites w/ vegetation present; 1=coniferous, 3=deciduous)

Canopy Layer Avg:	1.9	**Number of stations with canopy:**	10
Understory Avg:	2.9	**Number of stations with understory:**	10

Percent Areal Coverage (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

Canopy Layer:	**trees > 0.3 m DBH**	2.3
	trees< 0.3 m DBH	2.1
Understory:	**woody shrubs _saplings**	2.5
	tall herbs, forbs _grasses	1.1
Ground Cover:	**woody shrubs _seedlings**	1.5
	herbs, forbs, _grasses	3.0
	standing water or inundated veg	0.0
	barren or buildings	1.5
Substrate Type (within shoreline plot):	**bedrock**	0.0
	boulders	0.2
	cobble/gravel	0.4
	loose sand	0.4
	other fine soil/sediment	0.4
	vegetated	3.6
	other	0.2
Bank Features:	**angle (O:<30; 1: 30-75; 2:nr vertical)**	1.0
	vertical dist (M from wtrln to high wt):	0.0
	horiz. dist. (M from wtrln to high wt):	0.0

Human Influence (0 = absent, 1 = adjacent to or behind plot, 2 = present within plot)

buildings	1.1
commercial	0.0
park facilities	0.2
docks/boats	0.7
walls, dikes, or revetments	0.0
litter, trash dump, or landfill	0.2
roads or railroad	0.5
row crops	0.0
pasture or hayfield	0.0
orchard	0.0
lawn	0.4

other	0.0

Physical Habitat Characteristics

station depth (m; at 10 m from shore)	1.2

Bottom Substrate (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

bedrock	0.0
boulders	0.1
cobble	0.1
gravel	0.3
sand	0.7
silt	3.7
woody debris	1.2

Macrophyte Areal Coverage (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

submergent	2.7
emergent	0.8
floating	1.5
total weed cover	3.5
Do macrophytes extend lakeward (-1 = yes, 0 = no)	-1.0

Fish Cover (0 = absent, 1 = Present but sparse, 2 = moderate to heavy)

aquatic weeds	2.0
snags	0.0
brush or woody debris	0.8
inundated live trees	0.0
overhanging vegetation	0.9
rock ledges or sharp dropoffs	0.1
boulders	0.1
human structures	0.3

Zooplankton Report

ERISK1

Date 6/8/1999 Station: 1 Sample ID 68

Several kinds of algae and a few rotifers.

Number of organisms measured: #Delet

Group	Percent
Cladocera	#Deleted
Copepod	#Deleted
Other	#Deleted

Group	Percent
Small < 1mm	#Deleted
Large >= 1mm	#Deleted
Ratio of large to Smal	#Num!
Average size (mm):	0.37

Date 9/17/1999 Station: 1 Sample ID 41

About 1/3 mL counted. Site number and length of tow not labelled.

Number of organisms measured: #Delet

Group	Percent	Group	Percent
Cladocera	#Deleted	Small < 1mm	#Deleted
Copepod	#Deleted	Large >= 1mm	#Deleted
Other	#Deleted	Ratio of large to Smal	#Num!
		Average size (mm):	0.33

Aquatic Plant Data

ERIE

Sampler: Parsons, O'Neal

Survey Date: 9/16/1999

Max depth of growth (M): ~2.8

Comments Three otters on south shore of west end. Plant growth not as dense as years past. Did habitat survey, and plankton tow. Water green and turbid, but no evident blue green bloom.

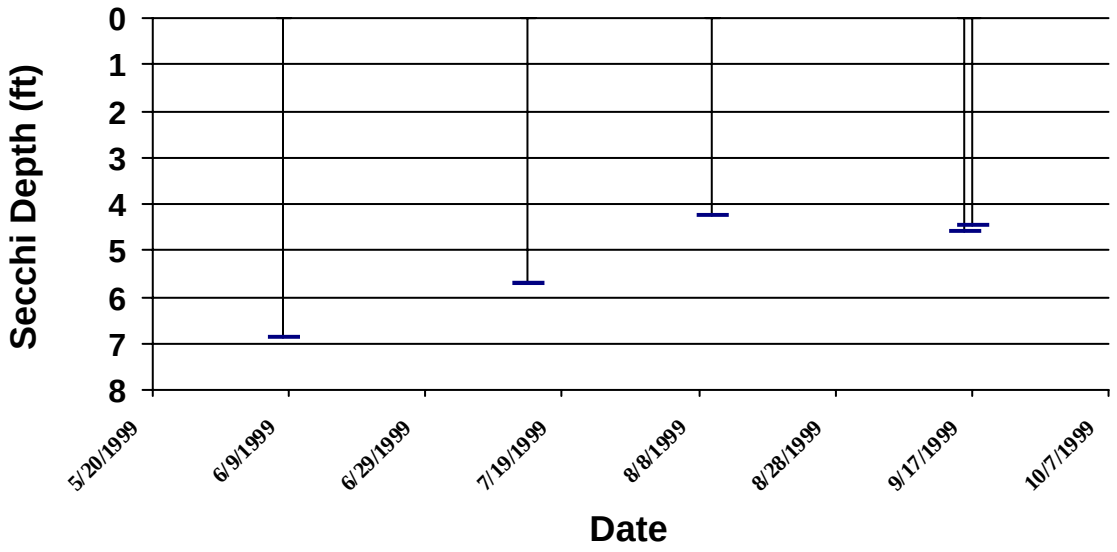
SPECIES LIST

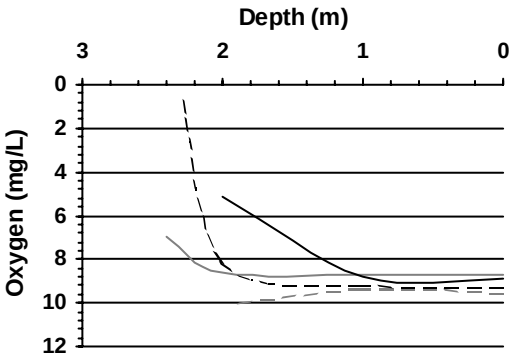
Scientific Name	Common Name	Dist [a]	Comments
Carex sp.	sedge	2	
Ceratophyllum demersum	Coontail; hornwort	2	
Chara sp.	muskwort	2	
Eleocharis sp.	spike-rush	2	
Elodea canadensis	common elodea	1	
Myriophyllum sibiricum	northern watermilfoil	2	at south end, much less than other years
Najas flexilis	common naiad	3	
Nuphar polysepala	spatter-dock, yellow water-lily	3	Some dense patches along shore
Phalaris arundinacia	reed canarygrass	2	
Potamogeton foliosus	leafy pondweed	3	
Potamogeton pectinatus	sago pondweed	3	to surface in some areas
Scirpus sp.	bulrush	2	bulrush
Solanum sp.	nightshade	1	nightshade
Sparganium sp.	bur-reed	1	
Typha latifolia	common cat-tail	2	
Utricularia vulgaris	common bladderwort	1	

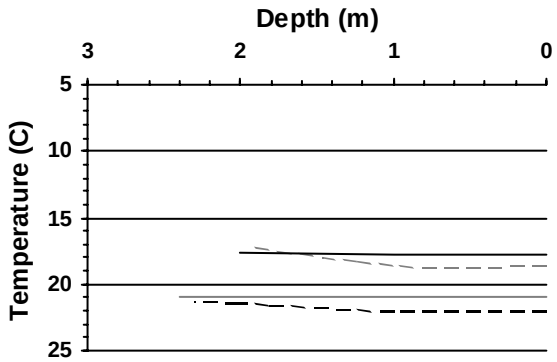
[a] 0 - value not recorded (plant may not be submersed)
1 - few plants in only 1 or a few locations
2 - few plants, but with a wide patchy distribution
3 - plants in large patches, codominant with other plants
4 - plants in nearly monospecific patches, dominant
5 - thick growth covering substrate to exclusion of other species

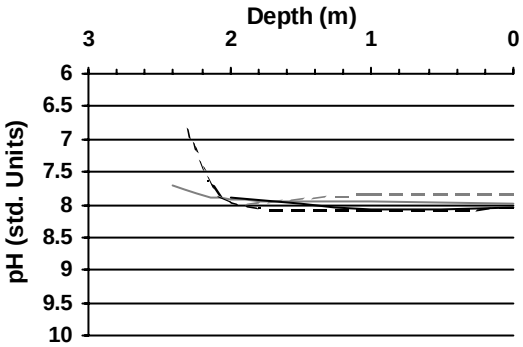
Secchi Depth and Profile Graphics

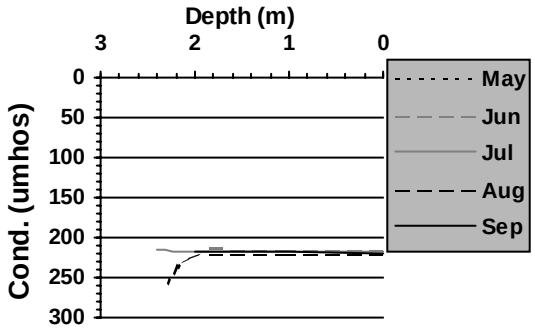
Station: 1 ERISK1











Secchi Data and Field Observations

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Date	Time	Temp-erature (F)	Secchi (ft)	Color (1-greens, 11-browns	Bright-ness (pct)	Wind (1-none, 5-gusty)	Rainfall (0-none, 5-heavy)	Aesthetics (1-bad, 5-good)	Swimming (1-poor, 5-good)	Geese (#)	Waterfowl (besides geese #)	Boats-Fishing (#)	Boats-Skiing (#)
Station 1													
6/8/1999			6.89 W		0	1	1	4	2	0	0	0	0
	Sampler: SMITH			Remarks: Bottom soft mud and plants (coontail). A bald eagle observed flying overhead.									
7/14/1999			5.74	6	100	4	4	4	1	0	1	0	0
	Sampler: SMITH			Remarks: Whole lake covered with plants on the bottom. Shoreline largely natural vegetation.									
8/10/1999			4.26	6	0	1	1	5	2	0	0	0	0
	Sampler: SMITH			Remarks: No zooplankton or turbidity taken									
9/16/1999			4.59										
	Sampler: Parsons			Remarks:									
9/17/1999			4.49	8	100		1	5	2	0	2	1	0
	Sampler: SMITH			Remarks: 20 homes									